

**BUMPLESS FLIP CHIP ASSEMBLY WITH SOLDER VIA  
ABSTRACT**

A flip chip assembly, and methods of forming the same, including a single or multi-layer substrate having a plurality of via holes which serve as the connection between the semiconductor device and substrate circuitry. The method of manufacturing the flip chip assembly includes the steps of attaching an integrated circuit (IC) chip having a plurality of input/output terminal pads to a rigid or flexible substrate having a plurality of via holes. The via holes are aligned with the terminal pads so that the respective traces on the substrate can be connected to the respective terminal pads through the via holes. After attachment, the pre-deposited solder inside the via holes or on the terminal pads is re-flowed. This re-flow soldering process electrically connects the IC chip to the substrate. The solder can be deposited by plating, wave soldering, meniscus coating, and screen printing techniques.